

SOLENOCERA ALFONSO, A NEW SPECIES OF
SHRIMP (PENAEOIDEA: SOLENOCERIDAE)
FROM THE PHILIPPINES

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Abstract.—A new species of penaeoid shrimp, *Solenocera alfonso*, is described and illustrated from specimens collected in the waters of the Philippines at depths between 176 and 547 m. This species possesses a spine on the dorsal midline of the carapace posterior to the cervical sulcus, a feature which distinguishes it from all of its congeners. It is compared with the Indo-West Pacific *S. australiana*, *S. halli*, and *S. melantho*.

Among the interesting materials encountered during a current study of the extensive collections of penaeoid shrimps obtained in the Philippines by the U.S. steamer *Albatross*, 1907-10, were representatives of a previously unknown species of *Solenocera*. This shrimp, which is now known to occur on the upper slope of the island platforms to depths of 547 m, is described and illustrated here. It is characterized by the presence of a spine on the dorsal midline of the carapace posterior to the level of the dorsal end of the cervical sulcus, a feature unique within the genus. This character, together with the hepatic and branchiocardiac sulci being curved in opposing arcs and the peculiar terminal armature of the ventromedian lobule of the petasma, make this species stand out from its relatives. In recent years, large collections of penaeoids have been assembled from Indonesia and the Philippines, and I hope that specimens of this shrimp will be discovered among these collections, thus expanding our knowledge of its geographical and ecological distribution.

Type-material is deposited in the National Museum of Natural History, Smithsonian Institution (USNM), and the Rijksmuseum van Natuurlijke Historie (RMNH), Leiden. The method of measuring the specimens and the terminology used below are described by Pérez Farfante (1969), and Pérez Farfante and Bullis (1973). In the captions of the figures, carapace length and total length are abbreviated cl and tl, respectively. The illustrations of the petasma were made from a specimen stained with methyl green.

Solenocera alfonso, new species
Figs. 1-5

Material (all from the Philippines).—Holotype: ♀, USNM 184022, 31.5 mm carapace length, about 114 mm total length, 10 mm rostrum length;

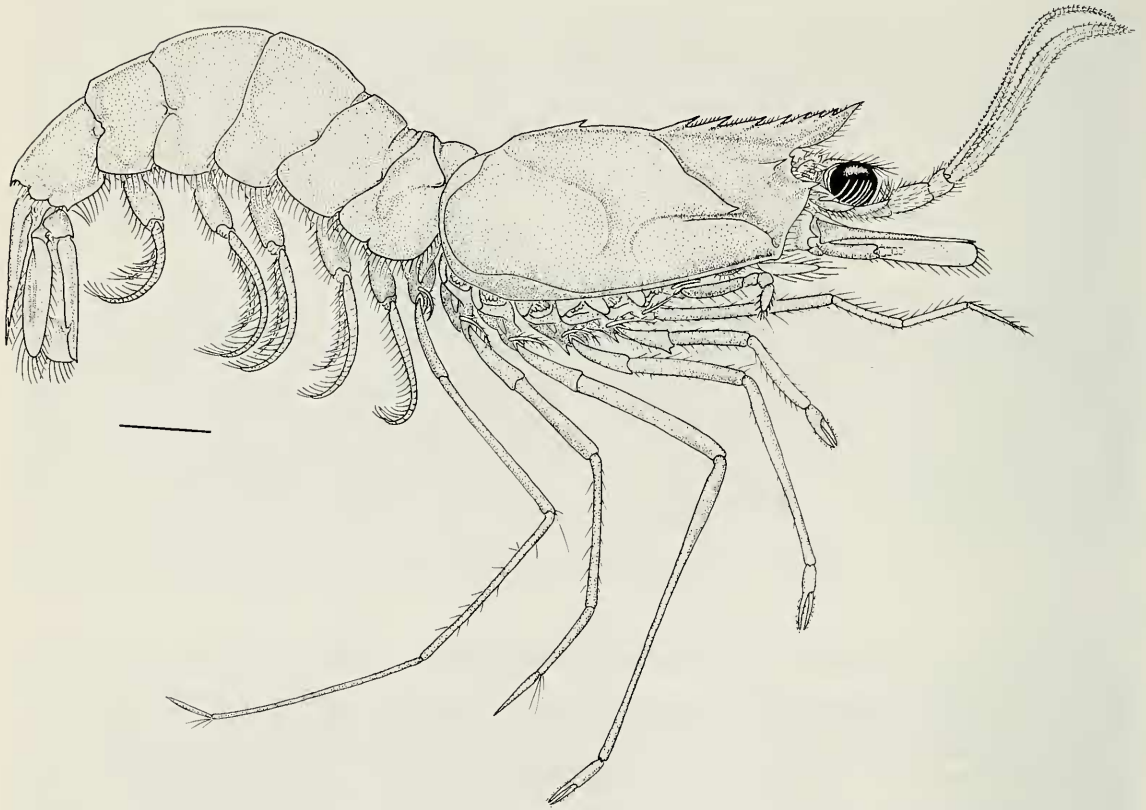


Fig. 1. *Solenocera alfonso*, holotype, USNM 184022, ♀ 31.5 mm cl, off Capitancillo I, W of Leyte, Philippines: Lateral view. Scale = 10 mm.

type-locality, off Capitancillo I, W of Leyte, 10°38'00"N, 124°13'08"E, 346 m, 18 March 1909, *Albatross* stn 5409. Allotype: ♂, USNM 184023, 26 mm carapace length, about 109 mm total length, 8.5 mm rostrum length, Macajalar Bay, N Mindanao, 8°37'37"N, 124°35'00"E, 391 m, 4 August 1909, *Albatross* stn 5501.

Paratypes: 1 ♀, USNM 184024, Balayan Bay, Luzon, 329 m, 20 February 1909, *Albatross* stn 5363. 1 ♂, USNM 184025, Tayabas Bay, SE Luzon, 357 m, 24 April 1908, *Albatross* stn 5222. 1 ♀, USNM 184026, SE of San Andrés Is, NW of Marinduque, 91–353 m, 24 April 1908, *Albatross* stn 5221. 1 ♀, USNM 184027, NE of Cebu, 130–271 m, 3 April 1908, *Albatross* stn 5194. 2 ♂ 1 ♀, USNM 184028, off Palompon, W Leyte, 344 m, 16 March 1909, *Albatross* stn 5402. 2 ♂ 1 ♀, USNM 184029, off Palompon, W of Leyte, 333 m, 16 March 1909, *Albatross* stn 5403. 1 ♂ 1 ♀, RMNH, N of Ponson I, W of Leyte, 348 m, 17 March 1909, *Albatross* stn 5404. 1 ♀, USNM 184030, N of Capitancillo I, W of Leyte, 291 m, 18 March 1909, *Albatross* stn 5408. 1 ♂, USNM 184031, S of Panay I, 176 m, 30 March 1908, *Albatross* stn 5183. 1 ♂ 2 ♀, USNM 184032, NE of Pescador I, E of Negros, 547 m, 1 April 1908, *Albatross* stn 5189. 3 ♂ 1 ♀, USNM 184033, NE of Pescador I, E of Negros, 549 m, 1 April 1908, *Albatross* stn 5188. 1

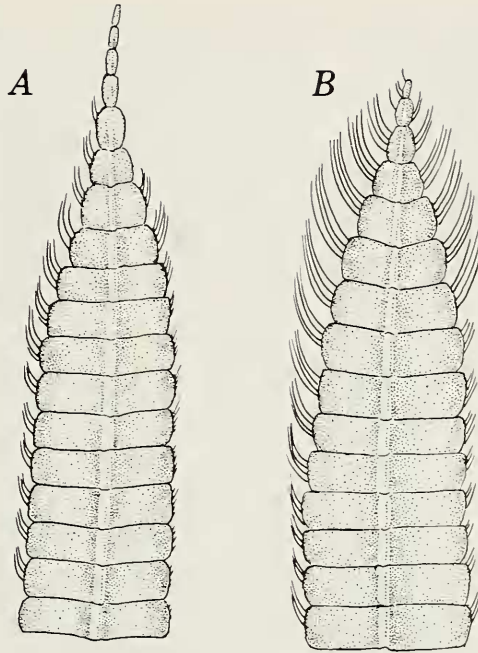


Fig. 2. *Solenocera alfonso*, paratype, USNM 184026, ♀ 40 mm cl, SE of San Andrés Is, NW of Marinduque, Philippines: Terminal parts of right antennular flagella—A, Dorsal; B, Ventral. Scale = 2 mm.

♂ 1 ♀, USNM 184034, S of Dumalag I, Davao Gulf, 247 m, 18 May 1909, *Albatross* stn 5247.

Description.—Body glabrous (Fig. 1) except for elongate patch of setae, typical of members of the genus, covering rostrum immediately dorsal to adrostral carina and continuing posteriorly to epigastric tooth. Rostrum almost reaching distomesial margin of eye, horizontal or tilted upward, deep, ventral margin convex along basal 0.7–0.8, apically almost straight. Number of rostral plus epigastric teeth 6–8 (usually 7), teeth progressively smaller and closer together from epigastric to ultimate, latter distinctly postapical; apex of fourth tooth in line with orbital margin. Adrostral carina, extending from orbital margin to or slightly beyond ultimate tooth. Postrostral carina well marked but comparatively low, and weakly depressed at level of dorsal extremity of cervical sulcus, bearing tooth slightly anterior to or at midlength between depression and midposterior margin of carapace; carina progressively lower behind tooth, and followed by minute dorsal tubercle located on depressed posteromedian portion of carapace. Median sulcus varying from well marked and almost continuous to being represented only by few pits. Marginal ridge of carapace narrow anteriorly, broadening and forming ventral lobe at about midlength of branchial region, and broadening again forming posterolateral lobe, finally becoming slender along midposterior section. Orbital spine small; postorbital spine longest of lateral cara-

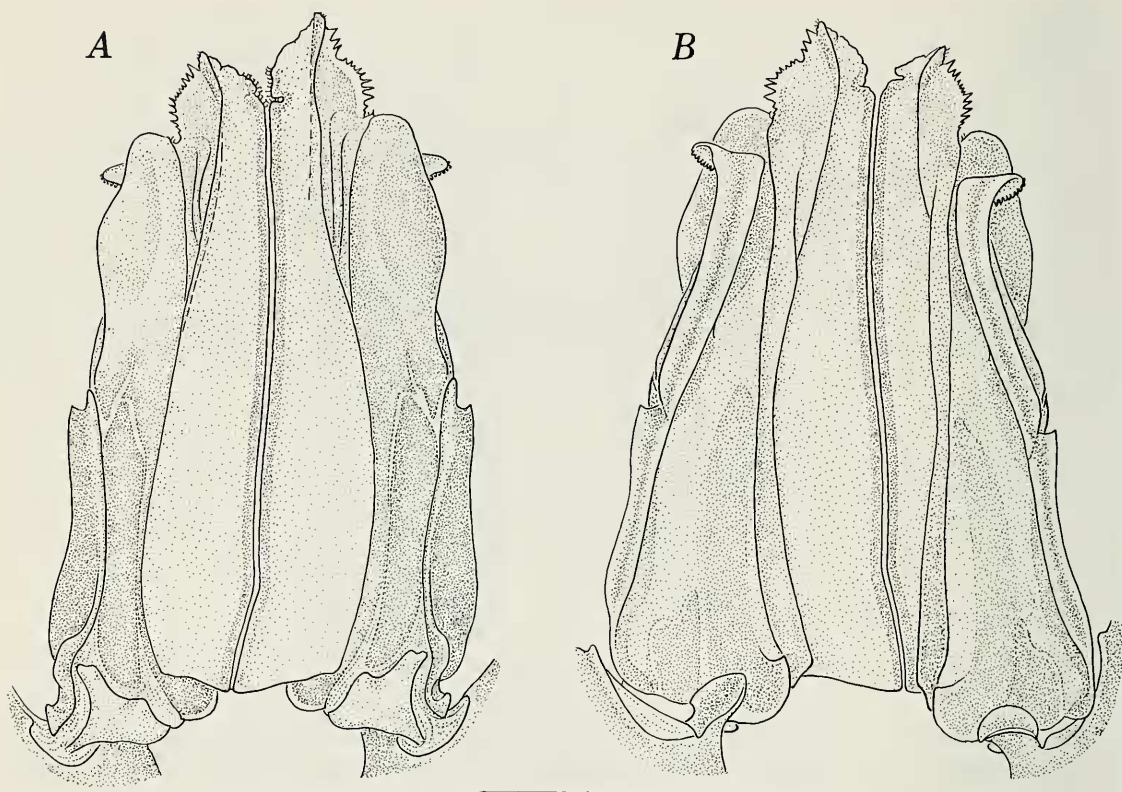


Fig. 3. *Solenocera alfonso*, allotype, USNM 184023, ♂ 26 mm cl, Macajalar Bay, N Mindanao, Philippines: **A**, Dorsal view of petasma; **B**, Ventral view of same. Scale = 2 mm.

pace spines, strong and continuous with conspicuous buttress; antennal spine slender; hepatic spine sharp. Pterygostomian and branchiostegal spines lacking. Orbits-antennal sulcus weakly defined. Cervical carina raised, sharp, with distinct bend just dorsal to hepatic region, its posterodorsal extremity ending at lateral base of epigastric tooth; cervical sulcus deep, merging ventrally with anterodorsally directed shallow groove and hepatic sulcus, junction forming deep depression just anterior to hepatic spine. Hepatic sulcus with posterior part, relatively shallow but well defined, turning ventrally in arc; anterior part deep and extending anteroventrally to pterygostomian pit; hepatic carina sharp anteriorly, its anteroventral extremity making sharp bend ventrally extending along posterior margin of tear shaped pterygostomian pit. Branchiocardiac sulcus and carina strongly defined, forming broad anterior arc and extending posterodorsally to near margin of carapace.

Antennular peduncle about 0.6 as long as carapace; prosartema reaching or almost reaching distomesial margin of eye, but its long setae attaining proximal third of second antennular article. Stylocerite relatively short, length equivalent to 0.65 that of first antennular article, and ending in inconspicuous spine; distolateral spine slender and sharp. Dorsal flagellum slightly longer than ventral, about 1.6 times carapace length while ventral flagellum 1.4 times carapace length in shrimp 23 mm cl; in shrimp 37 mm cl

dorsal 0.9 and ventral 0.7 times carapace length; terminal part of dorsal flagellum gradually tapering distally over 9 to 24 (latter in young) articles (Fig. 2A), that of ventral flagellum over 8 to 12 (Fig. 2B), in both flagella last few articles forming filament.

Scaphocerite overreaching antennular peduncle by 0.1 to 0.2 of its own length; lateral rib ending in strong, sharp spine, reaching or almost reaching distal margin of lamella. In available specimens, antennal flagellum as much as 4.1 times total length of shrimp.

Third maxilliped surpassing antennular peduncle by length of dactyl and about half that of propodus; ratio of dactyl/propodus 0.8–0.9.

First pereopod extending to distal end of carapocerite or exceeding it by as much as 0.8 length of propodus. Second pereopod overreaching antennular peduncle by at least 0.75 length of propodus and at most by propodus and extreme distal part of carpus. Third pereopod surpassing antennular peduncle by length of propodus and 0.3 to 0.5 that of carpus. Fourth pereopod overreaching peduncle by at least half length dactyl and at most by dactyl and 0.1 length of propodus. Fifth pereopod overreaching antennular peduncle by length of dactyl and almost entire propodus or by dactyl, propodus, and extreme distal part of carpus. Order of pereopods in terms of their maximum anterior extensions: first (shortest), fourth, second, fifth, and third—latter exceeding fifth only slightly if at all. Third maxilliped barely overreaching second pereopod. First pereopod armed with long, slender mesial spine on basis and slightly shorter one on ischium. Second pereopod bearing short spine on basis. In male, fifth pereopod bearing flattened, scale-like tooth on distomesial margin of coxa; in female short tooth borne on distomesial extremity of coxal plate.

Abdomen with middorsal carina from second through sixth somites, carina on second somite low and rounded (sometimes almost indistinct), that on third to sixth, high and sharp. Posterodorsal margin of third through fifth somites with median incision; sixth somite bearing conspicuous sharp spine at posterior end of carina and pair of small posteroventral spines. Telson tapering caudally to acute apex and bearing pair of small, fixed, lateral spines. Mesial ramus of uropod approaching apex of telson; lateral ramus reaching or barely surpassing distal border of mesial ramus, its marginal ridge ending in well developed spine. All sternites armed with laterally compressed, strong median tooth on posterior border, teeth decreasing in size posteriorly.

Petasma (Fig. 3A–B; Fig. 4B) with distal part of ventromedian lobule tapering rapidly and extending conspicuously beyond dorsolateral lobule, latter surpassing distally and overlapping ventral costa dorsally. Terminal margin of dorsomedian lobule unarmed, that of ventromedian lobule sinuous and bearing 10 to 18 irregular spinules of variable length. Distal part of dorsolateral lobule with lateral margin weakly biconcave, its terminal margin

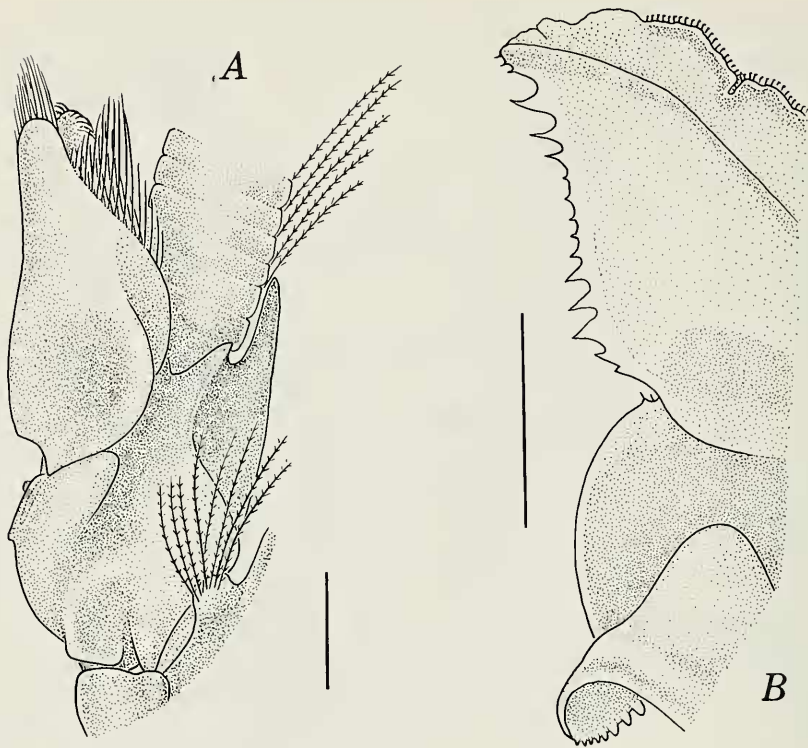


Fig. 4. *Solenocera alfonso*, allotype: A, Dorsolateral view of right appendix masculina; B, Dorsolateral view of distal part of left half of petasma. Scales = 1 mm.

armed with 1 or 2 well developed spinules at mesial extremity, and row of very minute ones (usually lost) extending onto lateral margin; lobule with stiff ridgelike thickening running obliquely from distal to proximolateral margins; thickening becoming obliquely truncate proximally, abutting distomesial border of proximal part of ventral costa. Ventral costa bent strongly outwardly, resulting flap, broadest mesially, and bearing 15 to 20 short spines on terminal margin. Junction of distal and proximal parts of ventral costa marked by deep emargination.

Appendix masculina (Fig. 4A) broadening from base to about midlength then tapering gradually to blunt apex, and bearing dorsolateral, strongly curved rib proximally; distal part of lateral margin armed with elongate patch of long setae, and apex with tuft of shorter ones. Appendix interna considerably narrower but extending as far as or slightly farther than appendix masculina, bearing apically closely set short setae. Basal sclerite with subvertical lateral wall projecting distally in blunt ventrolateral spur.

Thelycum (Fig. 5) with subquadrangular posterior depression delimited laterally by raised margins of sternite XIV and anteriorly by transverse ridge, sometimes interrupted, situated somewhat anterior to midlength of sternite; pair of slender, fusiform, submesial protuberances placed relatively far apart, immediately anterior and subperpendicular to transverse ridge (protuberances almost indistinguishable in young). Sternite XIII with high

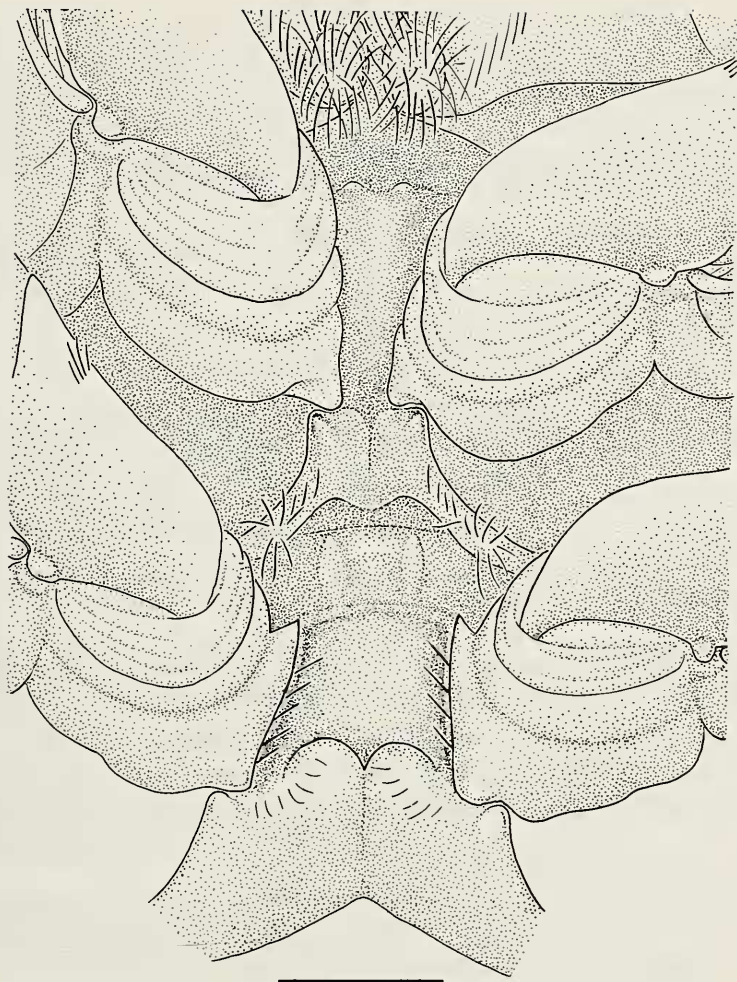


Fig. 5. *Solenocera alfonso*, holotype: Thelycum. Scale = 2 mm.

vertical posterior shelf divided by median slit and bearing pair of strong, acute, anterolateral tubercles; base of anterior third of sternite XIII crossed by transverse elevation continuous with caudomedian ridge. Posterior thoracic ridge with thick, setose, strongly biconvex anterior border.

Size.—Carapace lengths of males examined 15 to 29 mm, of females, 18 to 40 mm.

Geographic and bathymetric ranges.—This species has been found only in the waters of the Philippines: from Balayan Bay, SW Luzon, to Davao Gulf, SE Mindanao. It inhabits the upper slope of the island shelves, at depths of 176 to 547 m, and occurs on substrates of mud—mostly green mud—and at least occasionally on a mixture of fine sand and mud on which one of the 14 samples available was collected.

Remarks.—*Solenocera alfonso* is unique among the members of the genus in possessing a spine on the postrostral carina posterior to the cervical sulcus, about midway between the latter and the caudal margin of the carapace. In this species both the posterior part of the hepatic sulcus and the

anterior part of the branchiocardiac sulcus turn ventrally forming opposing arcs which are neither so well defined nor present together in any of its congeners. Also distinctive is the marginal carina of the carapace, which is expanded in two lobes on each side: one situated posteroventrally about midlength of the branchial region, the other posterolaterally near mid-dorsum.

This species closely resembles members of a homogeneous group of Indo-west-Pacific species comprising *S. australiana* Pérez Farfante and Grey, 1980, *S. halli* Starobogatov, 1972, and *S. melantho* De Man, 1907. This group, like *S. alfonso*, may be characterized by lacking branchiostegal and pterygostomial spines, possessing a hepatic carina ending at the pterygostomial region (not recurving posteriorly), and having a relatively low post-rostral carina that is only slightly depressed at the level of the cervical sulcus. *Solenocera alfonso* may be distinguished from the other three species not only by the peculiar features cited in the previous paragraph, but also by thelycal and petasmas characters.

In *S. alfonso* the distal part of the ventromedian lobule of the petasma tapers rapidly instead of gradually or being truncate, its free margin is sinuous and bears spinules of various lengths the number of which ranges from 10 to 18. In *S. australiana*, *S. halli*, and *S. melantho* the free margin of the ventromedian lobule is armed with numerous spinules which in the former two species increase in length laterally and in *S. melantho* are all about the same length, except for the lateralmost three or four that may be smaller. In *S. alfonso* the distal margin of the dorsolateral lobule at its mesial extremity bears only 1 or 2 readily distinguishable spinules continuous with a row of very minute ones which extend along the lateral margin (these spinules are missing in most of the specimens available, there remaining only the raised points where they were inserted). In *S. australiana* and *S. halli* the dorsolateral lobule bears numerous spinules (18 to 40) which decrease in length proximolaterally, and in *S. melantho*, although the margin may be armed with only 1 or 2 spinules at its mesial extremity—much like in *S. alfonso*—there are usually more, as many as 13; furthermore, the lobule itself is not stiffened by a ridgelike thickening as it is in *S. alfonso*.

The thelycum of *S. alfonso* differs mainly from that of the other three species in lacking lateral protuberances and possessing only one pair of submesial protuberances on the anterior part of sternite XIV, which are very slender and set relatively far apart. In the other three species the thelycum bears two pairs of protuberances or often three in *S. melantho*, and the submesial ones are usually rounded or oblong, or if slender, roughly fusiform and disposed transversely.

Etymology.—This species is named for my brother, Dr. Alfonso Pérez Farfante, my companion during my first explorations of the seashore. The specific name is to be treated as a noun in apposition.

Acknowledgments

Thanks are due Horton H. Hobbs, Jr., and Fenner A. Chace, Jr., of the Smithsonian Institution, and Bruce B. Collette, of the National Marine Fisheries Service, Systematics Laboratory, for their criticisms of the manuscript. María M. Diéguez prepared all of the illustrations except those of the antennular flagella which were drawn by Keiko Hiratsuka Moore; to both I am most grateful.

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